**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

| | | |
|---|---|---|
| WSOU INVESTMENTS, LLC d/b/a BRAZOS LICENSING AND DEVELOPMENT, | § § § § | CIVIL ACTION NO. 6:20-cv-473-ADA |
| Plaintiff, | § § § | **JURY TRIAL DEMANDED** |
| v. | § § § | |
| DELL TECHNOLOGIES INC., DELL INC., AND EMC CORPORATION, | § § § § | |
| Defendants. | § | |

**FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiff WSOU Investments, LLC d/b/a Brazos Licensing and Development ("Brazos" or "Plaintiff"), by and through its attorneys, files this First Amended Complaint ("Amended Complain" or "Complaint") for Patent Infringement against Dell Technologies Inc., Dell Inc., and EMC Corporation (collectively, "Defendants") and alleges:

**NATURE OF THE ACTION**

1.      This is a civil action for patent infringement arising under the Patent Laws of the United States, 35 U.S.C. §§ 1, et seq., including §§ 271, 281, 284, and 285.

**THE PARTIES**

2.      Brazos is a limited liability corporation organized and existing under the laws of Delaware, with its principal place of business at 605 Austin Avenue, Suite 6, Waco, Texas 76701.

3.      On information and belief, defendant Dell Technologies Inc. is a Delaware corporation with a principal place of business at One Dell Way, Round Rock, Texas 78682.

4.     On information and belief, defendant Dell Inc. is a Delaware corporation with a principal place of business at One Dell Way, Round Rock, Texas 78682.  Dell Inc. is wholly owned by its corporate parent, Dell Technologies Inc.

5.     On information and belief, defendant EMC Corporation is a Massachusetts corporation with a principal place of business at One Dell Way, Round Rock, Texas 78682. EMC Corporation is wholly owned by its corporate parent, Dell Technologies Inc.

## JURISDICTION AND VENUE

6.     This is an action for patent infringement which arises under the Patent Laws of the United States, in particular, 35 U.S.C. §§ 271, 281, 284, and 285.

7.     This Court has jurisdiction over the subject matter of this action under 28 U.S.C. §§ 1331 and 1338(a).

8.     This Court has specific and general personal jurisdiction over each defendant pursuant to due process and/or the Texas Long Arm Statute, because each defendant has committed acts giving rise to this action within Texas and within this judicial district. The Court's exercise of jurisdiction over each defendant would not offend traditional notions of fair play and substantial justice because each defendant has established minimum contacts with the forum. For example, on information and belief, each defendant has committed acts of infringement in this judicial district, by among other things, selling and offering for sale products that infringe the asserted patent, directly or through intermediaries, as alleged herein.

9.     Venue in the Western District of Texas is proper pursuant to 28 U.S.C. §§1391 and/or 1400(b). Each defendant has established places of business in the Western District of Texas. Each defendant is registered to do business in Texas. Upon information and belief, each defendant has transacted business in this District and has committed acts of infringement in this District.

## COUNT ONE - INFRINGEMENT OF
## U.S. PATENT NO. 9,137,144

10.     Brazos re-alleges and incorporates by reference the preceding paragraphs of this

Complaint.

11.     On September 15, 2015, the United States Patent and Trademark Office duly and

legally issued U.S. Patent No. 9,137,144 ("the '144 Patent '"), entitled "Method and Apparatus for

Communication Path Selection." A true and correct copy of the '144 Patent is attached as Exhibit

A to this Complaint.

12.     Brazos is the owner of all rights, title, and interest in and to the '144 Patent,

including the right to assert all causes of action arising under the '144 Patent and the right to any

remedies for the infringement of the '144 Patent.

13.     Defendants make, use, sell, offer for sale, import, and/or distribute in the United

States, including within this judicial district, products such as, but not limited to, network operating

systems,    including but not limited to, the Dell EMC SmartFabric Operating System (collectively,

the "Accused Products").

14.     The Accused Products support multiple architecture and environments.

Dell EMC SmartFabric OS10 is a network operating system (NOS) supporting multiple architectures and environments. The SmartFabric OS10 solution allows multi-layered disaggregation of network functionality. SmartFabric OS10 bundles industry-standard management, monitoring, and Layer 2 and Layer 3 networking stacks over CLI, SNMP, and REST interfaces. Users can choose their own third-party networking, monitoring, management, and orchestration applications. To develop scalable L2 and L3 networks, the SmartFabric OS10 delivers a modular and disaggregated solution in a single-binary image.

Source: https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf

15.     The Accused Products include standard networking features and switching routing

protocols. The Accused Products     OS also provide     a method of selecting a communication

path from a group of equal-cost paths with the help of hashing. The hash algorithm makes decisions that are based on values in various packet fields and internal values.

**SmartFabric OS10 key features**

- Standard networking features, interfaces, and scripting functions for legacy network operations integration
- Standards-based switching hardware abstraction through the Switch Abstraction Interface (SAI)
- Pervasive, unrestricted developer environment through Control Plane Services (CPS)
- Layer 2 switching and Layer 3 routing protocols with integrated IP services, quality of service, manageability, and automation features
- Increase VM Mobility region by extending L2 VLAN within or across two DCs with unique VLT capabilities
- Programmatic APIs and CLI automation using batch and aliases to simplify configuration management
- Converged network support for Data Center Bridging, with priority flow control (802.1Qbb), ETS (802.1Qaz), DCBx, and iSCSI TLV

Source: https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf

# Equal cost multi-path

ECMP is a routing technique where next-hop packet forwarding to a single destination occurs over multiple best paths. When you enable ECMP, OS10 uses a hash algorithm to determine the next-hop. The hash algorithm makes hashing decisions based on values in various packet fields and internal values.

Source: https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf

16.    A VLAN, or Virtual Local Area Network, provides a way to group devices with a LAN. A group of devices within a VLAN communicate as if they were attached to the same wire.

**What is a VLAN**

Within a switched internetwork, VLANs provide segmentation and organizational flexibility. VLANs provide a way to group devices within a LAN. A group of devices within a VLAN communicate as if they were attached to the same wire. VLANs are based on logical connections, instead of physical connections.

Source: https://www.dell.com/community/Connectrix/An-Introduction-to-VLAN-and-Trunk/td-p/7076385,

17.     For configuring the load balancing parameters, a router/switch can use the hash

fields as VLAN -ID for the hash calculations.

## load-balancing

Distributes or load balances incoming traffic using the default parameters in the hash algorithm.

Syntax
```
load-balancing {ingress-port enable | [tcp-udp-selection l4-destination-port |
l4-source-port] | [ip-selection destination-ip | source-ip | protocol | vlan-id
| l4-destination-port | l4-source-port] | [ipv6-selection destination-ip |
source-ip | protocol | vlan-id | l4-destination-port | l4-source-port] | [mac-
selection destination-mac | source-mac | ethertype | vlan-id]}
```

Parameters
- `ingress-port enable` — Enables load-balancing on ingress ports.
- `tcp-udp-selection` — Enables the TCP UDP port for the load-balancing configuration.
- `ip-selection` — Enables IPv4 key parameters to use in the hash computation.
- `ipv6-selection` — Enables IPV6 key parameters to use in hash computation.
- `destination-ip` — Enables the destination IP address in the hash calculation.
- `source-ip` — Enables the source IP address in the hash calculation.
- `protocol` — Enables protocol information in the hash calculation.
- `vlan-id` — Enables VLAN ID information in the hash calculation.

Source: https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf

18.     The resilient hashing algorithm helps in determining the best paths for
communication traffic. Hashing helps in mapping     the VLAN ID with a set     of lowest-cost
paths by using VLAN ID for hash calculations.     .

## Resilient hashing

To increase bandwidth and for load balancing, traffic distributes across the next hops of an ECMP group or member ports of a port channel. OS10 uses a hash algorithm to determine a hash key. The egress port in a port channel or the next hop in an ECMP group is selected based on the hash key modulo the number of ports in a port channel or next hops in an ECMP group, respectively. When a member link goes down or a new member link is added, the traffic flows remap based on the new hash result.

In this section, the term, "member link" refers to either a member physical port, in the case of port channels or next hop in the case of ECMP groups.

Source: https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf

19.     ECMP (i.e., equal-cost multipath routing) is a routing technique where next-hop

packet forwarding (i.e., forwarding through the node) to a single destination can occur over

multiple best paths (i.e., lowest cost paths).

20.     There are multiple nodes between a single source node and a destination node.

These multiple nodes give rise to multiple paths. The Accused Products     use     ECMP to

determine the multiple best paths. The best paths are the lowest cost paths, i.e., paths with the

minimum number of hops between the source node and destination node. These paths are used for

forwarding packet from the source node to the destination node. (i.e., a plurality of contiguous

communication                                                                            paths).

ECMP is a routing technique where next-hop packet forwarding to a single destination occurs over multiple best paths. When you enable ECMP, OS10 uses a hash algorithm to determine the next-hop. The hash algorithm makes hashing decisions based on values in various packet fields and internal values.

Source: https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf

21.     The resilient hashing algorithm helps in determining the best paths for

communication traffic and   helps in load balancing. In resilient hashing, the egress port in a port-

channel or th enext hop in an ECMP group is selected based on the       hash key modulo,    the

number of ports in a port channel or next-hops in an ECMP group, respectively   .

## Resilient hashing

To increase bandwidth and for load balancing, traffic distributes across the next hops of an ECMP group or member ports of a port channel. OS10 uses a hash algorithm to determine a hash key. The egress port in a port channel or the next hop in an ECMP group is selected based on the hash key modulo the number of ports in a port channel or next hops in an ECMP group, respectively. When a member link goes down or a new member link is added, the traffic flows remap based on the new hash result.

In this section, the term, "member link" refers to either a member physical port, in the case of port channels or next hop in the case of ECMP groups.

Source: https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf.

## load-balancing

Distributes or load balances incoming traffic using the default parameters in the hash algorithm.

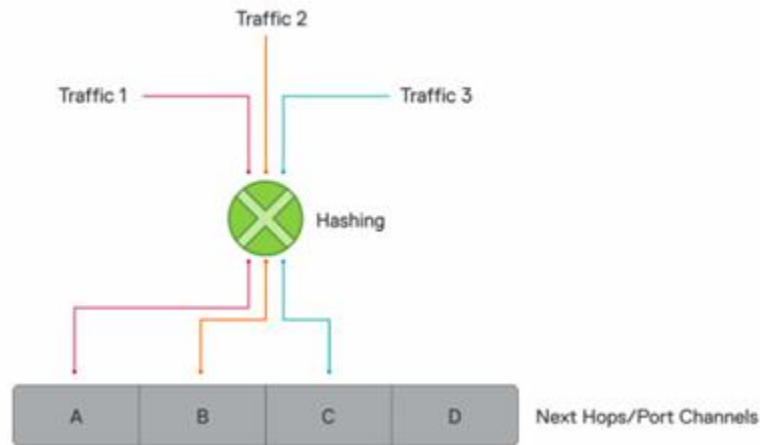| Syntax | load-balancing {ingress-port enable \| [tcp-udp-selection l4-destination-port \| l4-source-port] \| [ip-selection destination-ip \| source-ip \| protocol \| vlan-id \| l4-destination-port \| l4-source-port] \| [ipv6-selection destination-ip \| source-ip \| protocol \| vlan-id \| l4-destination-port \| l4-source-port] \| [mac-selection destination-mac \| source-mac \| ethertype \| vlan-id]} |
|---|---|
| Parameters | · ingress-port enable — Enables load-balancing on ingress ports.<br>· tcp-udp-selection — Enables the TCP UDP port for the load-balancing configuration.<br>· ip-selection — Enables IPv4 key parameters to use in the hash computation.<br>· ipv6-selection — Enables IPV6 key parameters to use in hash computation.<br>· destination-ip — Enables the destination IP address in the hash calculation.<br>· source-ip — Enables the source IP address in the hash calculation.<br>· protocol — Enables protocol information in the hash calculation.<br>· vlan-id — Enables VLAN ID information in the hash calculation. |

Source: https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf

22.     Without resilient hashing, traffic is mapped to the identified ECMP paths based on the next-hop availability. As shown below, Traffic 1 maps to next-hop A, Traffic 2 maps to next-hop B, and Traffic 3 maps to next-hop C, respectively.
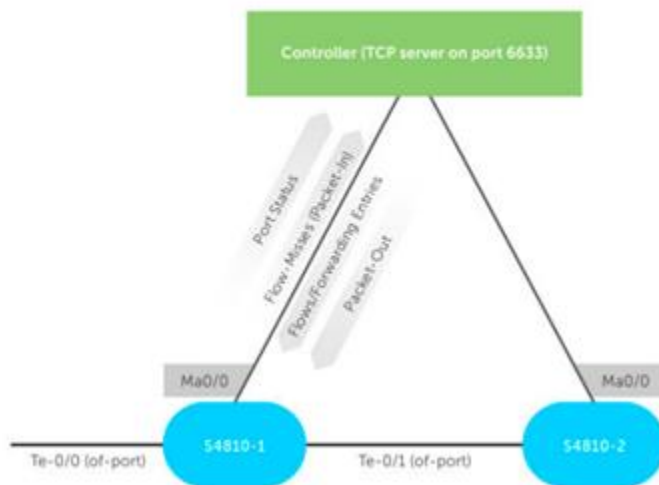


Source: https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf

23.     In a software-defined network (SDN), the flow-maps help specify the flow of traffic. In SDN, an external controller cluster manages the network and the resources on a switch operating on the Dell FTOS. OpenFlow is a protocol used for communication between the controller and the switch. Flow-

map helps specify the flows installed by the controller to be interpreted by the switch for the placement of

Layer 2 and Layer 3 flow-map tables.

In the example topology below, the controller uses the OpenFlow protocol to communicate with two S4810 switches.



Source: https://topics-cdn.dell.com/pdf/force10-sw-defined-ntw_deployment-guide3_en-us.pdf

## flow-map

Specify if flows installed by the controller should be interpreted by the switch for placement in L2 or L3 tables.

| Syntax | `flow-map {l2|l3} enable` |
| --- | --- |
| | To disable flow interpretations, use the `no flow-map {l2|l3} enable` command. |
| Parameter | |
| l2 | Enter l2 to interpret Layer 2 flows. |
| l3 | Enter l3 to interpret Layer 3 flows. |

Source: https://topics-cdn.dell.com/pdf/force10-sw-defined-ntw_deployment-guide3_en-us.pdf

24.    In the software-defined network, the layer 2 flows are only supported on

OF(OpenFlow) VLAN.

## L2 Flows

L2 flows are only supported on OF VLANs. In the following example, `of-instance 2` is used to demonstrate an L2 flow. To use the L2 flow table, enable the `multiple-fwd-table` and `flow-map 12` commands, as shown in the following example. If you do not enable either command, L2 flows are added to the ACL table.

```
Dell#show running-config openflow of-instance 2
!
openflow of-instance 2
 controller 1 10.11.205.184  tcp
 flow-map 12 enable
 flow-map 13 enable
 interface-type vlan
 multiple-fwd-table enable
 no shutdown
```

The following example demonstrates a sample flow `of-vlan 200`:

```
Dell#show openflow flows of-instance 2

Instance: 2, Table: mac, Flow: 4, Cookie: 0xffffffffac2dbbf2
Priority: 32768, Internal Priority: 0
Up Time: 0d 00:00:09, Hard Timeout: 0 seconds
Idle Timeout: 0 seconds, Internal Idle Timeout: 0 seconds
Packets: -, Bytes: -
Match Parameters:
  Valid Match: DMAC,Vid
  In Port    : *                     EType     : *
  SMAC       : *                     DMAC      : 00:22:22:22:22:22
  VLAN id    : 200                   VLAN PCP  : *
  IP TOS     : *                     IP proto  : *
  Src IP     : *                     Dest IP   : *
  Src Port   : *                     Dest Port : *
 Actions:
  Output: Te 0/1
```

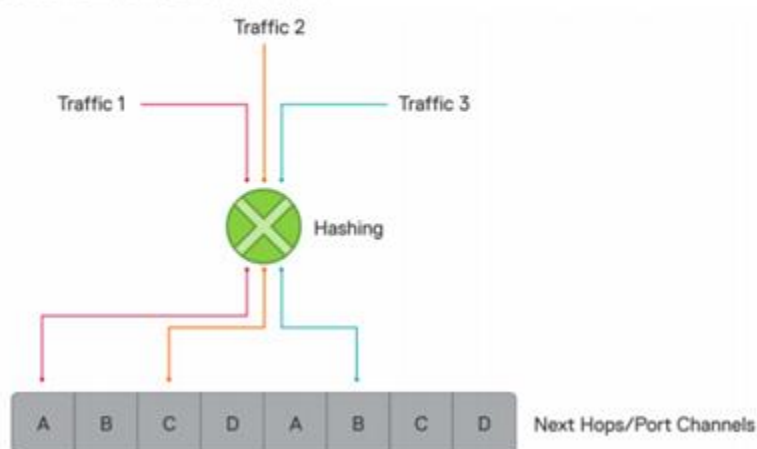Source: https://topics-cdn.dell.com/pdf/force10-sw-defined-ntw_deployment-guide3_en-us.pdf

25.     When a user enables resilient hashing for ECMP groups, the flow-map table (for a software-defined network) is created with 64 paths, and traffic is equally distributed for these 64 paths (i.e. N number of the lowest-cost paths in the plurality of communication paths). The flow-

map table considers L2 flows (based on VLAN identifiers) to map the traffic over the identified

64 paths.

26.      As shown below, Traffic 1 maps to next-hop 'A'; Traffic 2 maps to next-hop 'C';

and Traffic 3 maps to next-hop 'B. For the L2 flows and flow-map table, the traffic may correspond
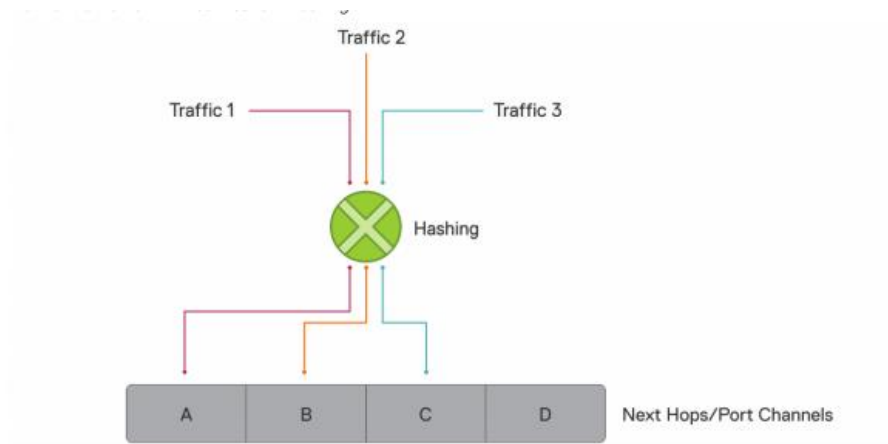
to the respective VLANs for mapping.

Traffic flow with resilient hashing enabled

When you enable resilient hashing for ECMP groups, the flow-map table is created with 64 paths (the OS10 default maximum number of ECMP paths) and traffic is equally distributed. In the following example, traffic 1 maps to next hop 'A'; traffic 2 maps to next hop 'C'; and traffic 3 maps to next hop 'B.'



Source: https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf

27.      After the resilient hashing for the ECMP groups, a flow-map table is created with

64 paths for the traffic flow (i.e. path selection table having indices of the 64 lowest cost paths).

The paths on the flow-map table distribute the traffic equally and identify the traffic uniquely. As

shown below, Traffic 1 is mapped on the next-hop A (i.e. path A). The paths/next hops are uniquely

identified (based on a unique index) by to load balance the traffic.

*Traffic flow with resilient hashing enabled*

When you enable resilient hashing for ECMP groups, the flow-map table is created with 64 paths (the OS10 default maximum number of ECMP paths) and traffic is equally distributed. In the following example, traffic 1 maps to next hop 'A'; traffic 2 maps to next hop 'C'; and traffic 3 maps to next hop 'B.'
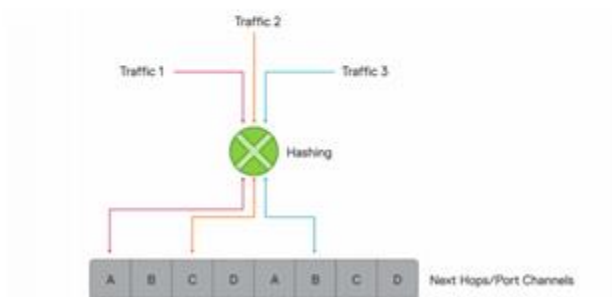
Source: https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf

28.     After the resilient hashing, Traffic 1 maps (i.e., selecting a path associated with an index equal to the result) to next-hop A, Traffic 2 maps to next-hop C & Traffic 3 maps to next-hop B.
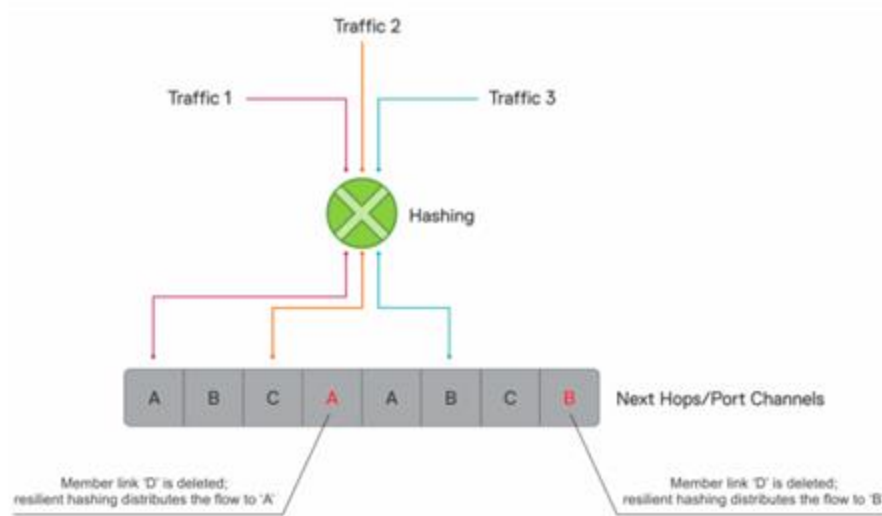


Source: https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf

29.     If member link D goes down, resilient hashing distributes the traffic intended for member link D to A and B. The existing 1, 2, and 3 traffic is not disturbed. However, when a new member link is added, resilient hashing completes minimal remapping for better load balancing.
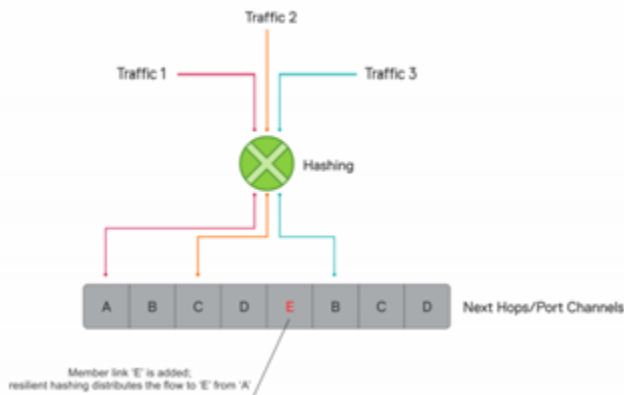
**Member link goes down**

In the following example, if member link D goes down, resilient hashing distributes the traffic intended for member link D to A and B. The existing 1, 2, and 3 traffic is not disturbed.



Source: https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf

**Member link is added**

However, when a new member link is added, resilient hashing completes minimal remapping for better load balancing, as shown:



Source: https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf

30.     In view of preceding paragraphs, each and every element of at least claim 1 of the '144 Patent is found in the Accused Products.

31.     Defendants continue to directly infringe at least one claim of the '144 Patent, literally or under the doctrine of equivalents, by making, using, selling, offering for sale, importing,

and/or distributing the Accused Products in the United States, including within this judicial district, without the authority of Brazos.

32.     And upon information and belief, each and every element of at least claim 1 of the patent-in-suit is performed or practiced by Defendants at least through Defendants' own use and configuration of its own Accused Products, and/or through Defendants' own testing and configuration of its own Accused Products, and/or through Defendants' providing services for its Accused Products, including but not limited to providing installation, deployment, support and configuration of its Accused Products.

33.     In May 2020, Plaintiff filed a suit against Defendants asserting infringement of the same patent and by the same accused products that are asserted in this case.  Plaintiff dismissed the prior suit before filing this suit.  As a result of the prior suit, Defendants had notice and actual or constructive knowledge of their infringement of the patent-in-suit since at least May 2020, before the filing of this case.  Further, Defendants had knowledge of their infringement of the patent-in-suit before the filing of this Amended Complaint.[1].

34.     Since at least May 2020, through its actions, Defendants have actively induced product makers, distributors, retailers, and/or end users of the Accused Products to infringe the

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[1] Dell filed a motion to dismiss that is mooted by this amended complaint.  Dell's motion cites a WDTX case (which relies authority from the District of Delaware) for the proposition that knowledge of a plaintiff's patent after the lawsuit was filed is insufficient to plead the requisite knowledge for indirect infringement. *See Aguirre v. Powerchute Sports, LLC*, No. SA-10-CV-0702 XR, 2011 WL 2471299, at *3 (W.D. Tex. June 17, 2011) (citing *Xpoint Techs. v. Microsoft Corp.*, 730 F.Supp.2d 349 (D. Del. 2010)). Several Delaware courts have since rejected this rule because there is no statutory basis to support it and because there is no purpose served by the formality of requiring the plaintiff to file an amended complaint in order to be allowed to assert knowledge of the patents during the period following the filing of the original complaint. *See Walker Digital, LLC v. Facebook, Inc.*, 852 F. Supp. 2d 559, 566 (D. Del. 2012) ("The court acknowledges that this result is inconsistent with its prior decisions in *Xpoint Techs. v. Microsoft Corp.*, 730 F.Supp.2d 349 (D.Del.2010), and *EON Corp. IP Holdings LLC v. FLO TV Inc.*, 802 F.Supp.2d 527 (D. Del. 2011). Given the ease of amendment, the limitation of damages to post-knowledge conduct, and in the interests of judicial economy, the court finds that the better

'144 Patent throughout the United States, including within this judicial district, by, among other things, advertising and promoting the use of the Accused Products in various websites, including providing and disseminating product descriptions, operating manuals, and other instructions on how to implement and configure the Accused Products. Examples of such advertising, promoting, and/or instructing include the documents at:

- https://topics-cdn.dell.com/pdf/smartfabric-os10-5-0_en-us.pdf
- https://www.dell.com/community/Connectrix/An-Introduction-to-VLAN-and-Trunk/td-p/7076385

35.     Since at least May 2020, through its actions, Defendants have contributed to the infringement of the '144 Patent by having others sell, offer for sale, or use the Accused Products throughout the United States, including within this judicial district, with knowledge that the Accused Products infringe the '144 Patent. The Accused Products are especially made or adapted for infringing the '144 Patent and have no substantial non-infringing use. For example, in view of the preceding paragraphs, the Accused Products contain functionality which is material to at least one claim of the '144 Patent.

## JURY DEMAND

Brazos hereby demands a jury on all issues so triable.

## REQUEST FOR RELIEF

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reasoning is to allow a complaint that satisfies Rule 8 to proceed to discovery rather than dismissing it for lack of pre-filing knowledge when, by the time the motion to dismiss has been filed, defendant in fact has the requisite knowledge as pled by plaintiff."); *see also IOENGINE, LLC v. PayPal Holdings, Inc.*, CV 18-452-WCB, 2019 WL 330515, at *4 (D. Del. Jan. 25, 2019) ("The Court sees no purpose that would be served by the formality of requiring IOENGINE to file an amended complaint in order to be allowed to assert knowledge of the patents during the period following the filing of the original complaint.").

WHEREFORE, Brazos respectfully requests that the Court:

(A)     Enter judgment that Defendants infringe one or more claims of the '144 Patent literally and/or under the doctrine of equivalents;

(B)     Enter judgment that Defendants have induced infringement and continue to induce infringement of one or more claims of the '144 Patent;

(C)     Enter judgment that Defendants have contributed to and continue to contribute to the infringement of one or more claims of the '144 Patent;

(D)     Award Brazos damages, to be paid by Defendants in an amount adequate to compensate Brazos for such damages, together with pre-judgment and post-judgment interest for the infringement by Defendants of the '144 Patent through the date such judgment is entered in accordance with 35 U.S.C. § 284, and increase such award by up to three times the amount found or assessed in accordance with 35 U.S.C. § 284;

(E)     Declare this case exceptional pursuant to 35 U.S.C. § 285; and

(F)     Award Brazos its costs, disbursements, attorneys' fees, and such further and additional relief as is deemed appropriate by this Court.

Dated:10/19/2020                           Respectfully submitted,

                                           */s/ James L. Etheridge*
                                           James L. Etheridge
                                           Texas State Bar No. 24059147
                                           Ryan S. Loveless
                                           Texas State Bar No. 24036997
                                           Travis L. Richins
                                           Texas State Bar No. 24061296
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